

Environmental Assessment
March 2002

**INSTALLATION OF IRRIGATION PIPELINE INTO PORTION OF OAK CREEK (BOWN)
IRRIGATION CANAL**

Capitol Reef
National Park • Utah

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Summary

The Sandy Ranch owns land immediately adjacent to Capitol Reef National Park, and maintains an irrigation canal that passes through the park. The canal, of which 10,298 feet pass through park lands, was completed in 1924 and draws water from Oak Creek. The Ranch retains a right-of-way to operate and maintain the ditch, and proposes to underground a portion of this ditch by installing approximately 4,069 feet of piping. The pipe would be installed through a portion of the ditch, along a roadbed, and a short section (approximately 643 feet) that would pass through a portion of previously undisturbed land. Approximately 3,491 feet of the existing canal would be abandoned. Installation of the proposed pipeline would significantly reduce water loss by eliminating water passing through the ditch floor into the ground, and especially by eliminating frequent washouts of the ditch caused by summer flash floods. Maintenance efforts and costs would be appreciably reduced, as would environmental impacts associated with these maintenance operations.

This environmental assessment examines two alternatives: no action and the preferred alternative. The preferred alternative would reduce resource damage caused by frequent washouts and subsequent maintenance activities, and water loss would be reduced.

The preferred alternative would not impact scenic values; prime and unique farmlands; air quality; water resources (including wetlands and floodplains); threatened and endangered, candidate species and species of special concern; the socioeconomic environment; wilderness values, park operations or environmental justice. Construction impacts to soils and biotic communities would be adverse, but short-term and minor in intensity. There would be no adverse impact to the canal, a historic feature.

Public Comment

If you wish to comment on the environmental assessment, you may mail comments to the address below. This environmental assessment will be on public review for 30 days. Please note that names and addresses of people who comment become part of the public record. **If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment.** We will make all submissions from organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

Superintendent
Capitol Reef National Park
Torrey, Utah 84775

TABLE OF CONTENTS

PURPOSE AND NEED	1
Purpose.....	1
Need	1
Purpose and Significance of the Park.....	2
Regulations and Policies.....	2
IMPACT TOPICS	4
Impact Topics Analyzed in this Environmental Assessment.....	4
Geology and Soils.....	4
Biotic Communities.....	4
Cultural Resources.....	4
Impairment of Park Resources or Values.....	4
Impact Topics Dismissed from Further Consideration.....	5
Prime and Unique Farmlands	5
Socioeconomic/Visitor Use.....	6
Environmental Justice.....	6
Air Quality	6
Scenic Values.....	6
Special Status Species.....	7
Water Resources, Including Wetlands and Floodplains	7
Wilderness Values	8
Park Operations.....	8
ALTERNATIVES CONSIDERED	8
No-Action Alternative	8
Preferred Alternative.....	9
Project Overview	9
Proposed Construction.....	11
Mitigation.....	11
ALTERNATIVES CONSIDERED AND DISMISSED	13
Route Pipeline Entirely through Existing Canal	13
Abandon Canal, Restoring Natural Stream Flow to Oak Creek.....	13
Construct Pipeline and Reclaim Abandoned Portion of Canal.....	14
ENVIRONMENTALLY PREFERRED ALTERNATIVE.....	14
SUMMARIES/COSTS.....	15
ENVIRONMENTAL CONSEQUENCES	17
Natural Resources	17
Affected Environment	17
Methodology	17
Cumulative Impacts.....	17
Impacts to Cultural Resources and Section 106 of the National Historic Preservation Act	18
Impacts of the Preferred Alternative	19

Geology and Soils	19
Cumulative Impacts	19
Conclusion	19
Biotic Communities	19
Cumulative Impacts	20
Conclusion	20
Cultural Resources	21
Cumulative Impacts	21
Section 106 Summary	21
Conclusion	21
Impacts of the No-Action Alternative	21
Cumulative Impacts	22
Conclusion	22
 CONSULTATION/COORDINATION	 23
 PREPARERS	 23
 LIST OF RECIPIENTS	 23
 REFERENCES	 23
 APPENDICES	
A: Cultural Resources Survey	26
B: Assessment of Affect	31
C: Letter to Utah State Historic Officer	36
D: Letter from Utah State Historic Officer	37
E: Public Involvement	38
 GRAPHICS	
1: Region and Vicinity Map	3
2: Project Area Map	10
 TABLES	
1: Methods Used to Ensure Objectives are Met	15
2: Comparison of Alternatives	15
3: Summary Comparison of Alternatives and Impacts	16

PURPOSE AND NEED

PURPOSE

The Sandy Ranch owns land adjacent to the eastern boundary of Capitol Reef National Park, and is modernizing their irrigation and water delivery systems to allow for reduced water loss and improved maintenance. A component of this system is an irrigation ditch (called the Bown Canal) that passes through the park. The water system supplying the Bown Canal originates at the Oak Creek [Upper Bowns] Reservoir, flows through ditches on U.S. Forest Service lands into a common ditch with water from a Pleasant Creek diversion, eventually empties into Lower Bowns Reservoir, and is released from the reservoir through electronically controlled gates into Oak Creek. A fifty-foot tall concrete dam across Oak Creek diverts water through floodgates and into the Bown Canal. The canal leads to a point where the water is conveyed across a wash (Flume Wash) through a 24 inch diameter inverse siphon. The distance from the siphon to where the canal leaves the park at its eastern boundary is approximately 5,846 feet. The canal opens into a small (0.10 acres) pond just inside of the park boundary. The Bown Canal is 10,300-feet long and was constructed between 1912 and 1926. In 1956, the Bureau of Land Management (BLM) granted a right-of-way (ROW) for construction, operation, and maintenance of the canal, which, at that date, passed through BLM administered lands. In 1969 the park was expanded and it now encompasses the land through which the canal passes; the park has administered the ROW since 1969. Vehicular access to the canal and the dam across park land is via a two-track road and is open only to off-highway husbandry vehicles (as defined by Utah State Code § 41-22-5.5) and licensed vehicles operated by park and ranch personnel who are licensed drivers.

Construction activities proposed by Sandy Ranch would occur between the siphon and the park boundary. The project area is located within the USGS 7.5 minute Sandy Creek Benches and Bear Canyon, Utah quadrangles at Sections 34 and 27, Township 31 South, Range 7 East, SLB & M. Sandy Ranch has requested permission to modify and underground portions of the canal that pass over park land. The goal of this project is the improvement of a water delivery system that will serve the needs of the Sandy Ranch (as authorized by their existing 1956 ROW) and to enhance the ability of the park to protect and conserve resources by minimizing environmental impacts. The proposed project is consistent with the 1916 NPS Organic Act, the park's enabling statute, and other applicable laws. As a unit of the National Park System, the park is legislatively mandated to manage its resources in a manner consistent with the NPS Organic Act. Park planning documents acknowledge the need to maintain valid existing rights in the park and the proposal is consistent with the 2001 Record of Decision for the Final Environmental Impact Statement and General Management Plan. Allowing this undertaking will assist the park in protecting resources both by reducing the amount of maintenance required to maintain the waterway, as well as permitting the park to issue a new right-of-way which will provide more specific detail in permitted maintenance activities on park lands.

NEED

Currently, summer flash floods frequently wash out portions of the canal, resulting in water loss and erosion. The Ranch incurs increased maintenance costs when these washouts occur, and damage to Park lands is exacerbated by water erosion and by maintenance activities. Monitoring initiated by the Ranch indicates a water loss rate of $\frac{3}{4}$ of one-second/foot, or roughly, six days of water flow per year. The Ranch proposes to underground a portion of this canal by installing approximately 3,575 feet of piping. The pipe would be installed through a portion of the existing ditch, along a roadbed, and a short section

(approximately 643 feet) that would pass through a portion of previously undisturbed land. Approximately 3,491 feet of the canal would be abandoned to the Park. Installation of the proposed pipeline would significantly reduce water loss by eliminating water passing through the ditch floor into the ground, and especially by eliminating frequent washouts of the ditch caused by summer flash floods. Maintenance efforts and costs expended by the Sandy Ranch would be appreciably reduced, as would environmental impacts associated with Ranch maintenance operations. The Park cannot unilaterally modify the existing right-of-way since the permit was grandfathered when the Park was expanded. Completion of this project would permit the Park to revise the 1956 right-of-way, providing more specific guidance to better protect Park resources.

PURPOSE AND SIGNIFICANCE OF THE PARK

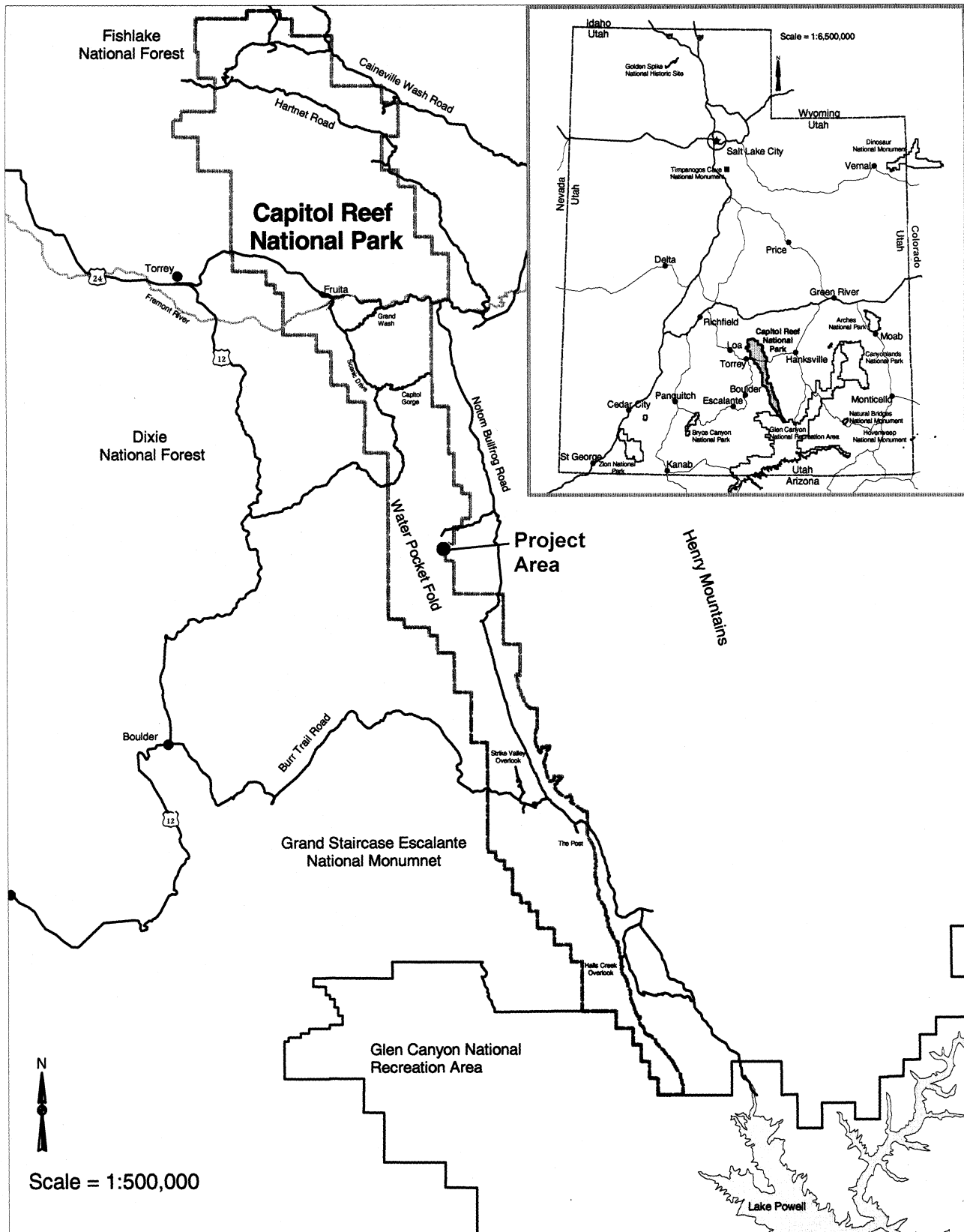
Capitol Reef National Monument, a reserve of 37,060 acres in the area of Fruita, Utah, was established by Presidential Proclamation 2246 in 1937. In 1958, Presidential Proclamation 3249 expanded the monument to 40,100 acres. The monument was further enlarged in 1969 (Presidential Proclamation 3888) to encompass much of the 100-mile-long Waterpocket fold, the largest exposed monocline in North America. In 1971, Congress abolished Capitol Reef National Monument and established Capitol Reef National Park, with its final boundaries encompassing 241,904 acres in and surrounding the Waterpocket Fold (Map 1).

This geological uplift (or colloquially, reef) creates a topographic obstacle stretching from Thousand Lake Mountain to what is now Lake Powell on the Colorado River. The purpose for which the area was originally set aside (Presidential Proclamations 2246 and 3249) is to reserve in the public interest the Waterpocket Fold and other features and objects of scientific interest. Resources of particular concern include a variety of geological features, strata, and mineral deposits. Biologically productive riparian areas, water quality in park streams, and the natural “waterpockets” for which the fold is named are similarly important. Other significant resources include air quality, scenic vistas, and night sky vistas; endangered, sensitive, protected, and candidate plant and animal species; the park’s biological diversity; and the park’s archeological, ethnographic, and historic resources, particularly the rural historic landscape of Fruita, a historic Mormon settlement.

Regulations and Policies

Current laws and policies require that the following conditions be achieved in the park:

Desired Condition	Source
Federal- and state-listed threatened and endangered species and their habitats are sustained.	Endangered Species Act; NPS Management Policies
Populations of native plant and animal species function in as natural condition as possible except where special management considerations are warranted	Park’s enabling legislation; NPS Management Policies
Historic properties are inventoried and their significance and integrity are evaluated under National Register criteria.	National Historic Preservation Act; Executive Order 11593; Archeological and Historic Preservation Act; the Secretary of the Interior’s Standards and Guidelines for Archeology and Historic Preservation; Programmatic Memorandum of Agreement among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Management Policies
The qualities that contribute to the eligibility for listing or listing of historic properties on the NRHP are protected in accordance with the Secretary of the Interior’s Standards (unless it is determined through a formal process that disturbance or natural deterioration is unavoidable).	



IMPACT TOPICS

Impact Topics Analyzed in this Environmental Assessment

Geology and Soils

Eolian Deposits and the Carmel formation typify the geology of the project area. Three soil types occur in the project area (USDA 1991). Mividia fine, sandy loam typifies the areas where construction will take place. A small portion of the canal lies within reff-rock outcrop formation, and a portion of the road in which the pipeline will be installed is characterized by a red bank-mido-ustic torrifluents complex. Because the proposed action involves ground disturbance activities, geology and soils will be addressed as an impact topic.

Biotic Communities

The proposed construction area is characterized by the trees *Pinus edulis* and *Juniperus osteosperma*, and the grasses, *Bouteloua gracilis*, *Oryzopsis hymenoides*, and *Stipa* spp. The saltbushes present are *Atriplex confertifolia* and *A. cuneata*. Other shrubs present are *Ephedra torreyana*, *Eriogonum corymbosum*, *Chrysothamnus viscidiflorus*, *Artemisia biglovii*, *Shepherdia rotundifolia*, *Gutierrezia sarothrae*, and *Amelanchier utahensis*. Cacti present are *Opuntia polyacantha* and *Scelerocactus parviflorus*. Willow (*Salix* sp.) occurs intermittently along the existing canal, and a few cottonwoods (*Populus fremontii*) are present near the pond. Wildlife species observed in the area include mule deer, coyotes, rabbits and hares, and various songbirds. No threatened, endangered, or candidate animal species are found in the project area, and no wetlands exist in the project area. Because the proposed action will impact vegetation and displace some wildlife, biotic communities will be addressed as an impact topic.

Cultural Resources

The National Historic Preservation Act requires agencies to take into account the effects of their actions on properties listed or eligible for listing on the National Register of Historic Places. The process begins with an identification and evaluation of cultural resources for National Register eligibility, followed by an assessment of effect on those eligible resources, and concluding after a consultation process. If an action (undertaking) could change in any way the characteristics that qualify the resource for inclusion on the National Register, it is considered to have an effect. No historic properties affected means that no cultural resources are affected. No adverse effect means there could be an effect, but the effect would not be harmful to those characteristics that qualify the resource for inclusion on the National Register. Adverse effect means the effect could diminish the integrity of the characteristics that qualify the resource for the National Register.

No historic buildings, structures, cultural landscapes, ethnographic resources, nor archeological resources were identified in the project area. The Oak Creek Canal has been determined to be an historic feature, and it may qualify for inclusion on the National Register. Placing a pipeline within the existing irrigation canal and abandoning portions of the canal may affect this historic feature. The project could possibly disturb unidentified archeological resources. Therefore, cultural resources will be addressed as an impact topic in this environmental assessment.

Impairment of Park Resources or Values

In addition to determining the environmental consequences of the preferred and other alternatives,

National Park Service policy (*Management Policies*, 2001) requires analysis of potential effects to determine whether actions would impair park resources.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values.

National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the National Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute an impairment. An impact would be more likely to constitute an impairment to the extent it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

Impairment may result from National Park Service activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. This environmental assessment will analyze the potential effects of all alternatives presented to determine if the alternative would result in an impairment of park resources. An impairment finding is included in the conclusion section for the following impact topics: Geology and Soils; Biotic Communities; and Cultural Resources, as well as the conclusion section for each alternative.

Impact Topics Dismissed from further Consideration

Issues and concerns affecting this project were identified by NPS specialists and input of other federal, state, and local agencies. These were distilled into distinct impact topics to facilitate the analysis of environmental consequences, which allows for a standardized comparison between alternatives based on the most relevant information. The impact topics were identified based on federal laws, regulations, and orders; NPS *Management Policies* (2001); and NPS knowledge of limited or easily impacted resources. The rationale for dismissing specific topics from further consideration is given below.

Prime and Unique Farmlands

In August 1980, the Council on Environmental Quality (CEQ) directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as prime or unique. Prime farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. None of the soils in the project

area meet classification criteria for prime and unique farmlands. Therefore, the topic of prime and unique farmlands was dismissed as an impact topic in this document.

Socioeconomic Environment/Visitor Use

None of the described actions would change either local or regional land uses nor impact local businesses or other agencies. Local and regional businesses would not be appreciably affected in the short-term because of the small size and remote location of the project.

Providing for visitor enjoyment is one of the elemental purposes of the NPS according to the 1916 Organic Act. The 2001 General Management Plan (GMP; USDI 2001) established provisions for recreational use by providing quality facilities for a more meaningful visitor experience. The project area is more than two miles west of the nearest public road, there is no easy public access to the area, and visitor use in the area is very limited. Disturbance during construction could negatively impact visitors, but in the long-term, visitor use will be benefited since maintenance on the waterway will be greatly reduced. Under the no action alternative, visitors would not be adversely impacted, except when maintenance is being done on the ditch. During these periods, visitors could be disturbed by noise. Impacts to visitors, businesses, or land uses are minimal if they are present at all. Therefore, socioeconomic environment and visitor use will not be addressed as an impact topic in this document.

Environmental Justice

Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed action would not have health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's Environmental Justice Guidance (1998). Therefore, environmental Justice was dismissed as an impact topic in this document.

Air Quality

Capitol Reef National Park was designated Class I under the 1977 amendments to the Clean Air Act. Under any alternative, local air quality would be temporarily affected by dust and vehicle emissions from construction or maintenance. Hauling material and operating equipment during the construction period would result in increased vehicle exhaust and emissions. Hydrocarbons, nitrous oxides (NO_x) and sulfur dioxide (SO₂) emissions would be rapidly dissipated by air drainage, as air stagnation is rare at the project site.

Overall, there would be a slight and temporary degradation of local air quality due to dust generated by activities and emissions from construction equipment. These effects would last only as long as construction activities occurred and the park's Class I air quality would not be affected by the proposal. Therefore, air quality was dismissed as an impact topic in this document.

Scenic Values

Conserving the scenery of national park units is a fundamental purpose of the 1916 NPS Organic Act. Providing for visitor enjoyment is one of the elemental purposes of the NPS according to the Organic

Act. The 2001 GMP established provisions for recreational uses by providing quality facilities for a more meaningful visitor experience. The proposed action will not impact scenic values.

Special Status Species (Threatened, Endangered, Proposed, and Species of Concern).

The 1973 Endangered Species Act, as amended, requires an examination of impacts to all federally listed threatened or endangered species, any other special status species, or designated critical habitats. National Park Service policy also requires examination of the impacts to state listed threatened and endangered species.

The park has determined that the following species with federal status occur in the park.:

Plants

Barneby reed-mustard	(<i>Schoenocrombe barnebyi</i>)	Endangered
Jones cycladenia	(<i>Cycladenia humilis</i> var. <i>jonesii</i>)	Threatened
Last Chance townsendia	(<i>Townsendia aprica</i>)	Threatened
Maguire's daisy	(<i>Erigeron maguirei</i>)	Threatened
Western nodding ladies-tresses	(<i>Spiranthes diluvialis</i>)	Threatened
Winkler cactus	(<i>Pediocactus winkleri</i>)	Threatened
San Raphael cactus	(<i>Pediocactus despainii</i>)	Endangered
Wright fishhook cactus	(<i>Sclerocactus wrightiae</i>)	Endangered
Rabbit Valley Gilia	(<i>Gilia caespitosa</i>)	Candidate

Animals

Mexican Spotted Owl	(<i>Strix occidentalis lucida</i>)	Threatened
Yellow-billed Cuckoo	(<i>Coccyzus americanus</i>)	Candidate

The park has no records of threatened, endangered or candidate plants species within the project area, and field examinations of the site by park staff confirm that none of the species listed above are found within the project area. The park believes that the project, as proposed, is not likely to adversely affect any protected species. Further, this project would not adversely impact wetlands or other important fish and wildlife habitat. Therefore, special status species was dismissed as an impact topic in this document.

Water Resources, Including Wetlands and Floodplains

National Park Service policies require protection of water quality consistent with the Clean Water Act (1977), a national policy to restore and maintain the chemical, physical, and biological integrity of the nation's waters and to prevent, control, and abate water pollution. Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers to prohibit or regulate, through a permitting process; discharge of dredged or fill material into U.S. waters. Groundwater does not occur near the surface at the project area. Runoff associated with existing and proposed drainage structures is discharged into permeable volcanic soils. There are no principal streams, lakes or impoundments of water within the project area. Water in the canal is diverted from Oak Creek through a valid water right, but Oak Creek is not within the project area, and will not be impacted.

Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid, where possible, impacts on wetlands. Proposed actions that have the potential to adversely impact wetlands must be addressed in a Statement of Findings. There are no jurisdictional wetlands within or near the project area, therefore, the topic of wetlands has been dismissed from further analysis and a Statement of Findings for wetlands will not be prepared.

Executive Order 11988, Floodplain Management, requires all federal agencies to avoid construction within the 100-year floodplain unless no other practical alternative exists. Certain construction within a 100-year floodplain requires preparation of a Statement of Findings. There are no 100-year floodplains within the project area, therefore, floodplains was dismissed as an impact topic and a Statement of Findings for floodplains will not be prepared.

Wilderness Values

Approximately 75 percent of the park is proposed wilderness (USDI 1974) and is considered a natural zone (USDI 2001). The project is not located in a portion of the park that is in proposed wilderness and was specifically excluded because of the water diversion. Wilderness would not be impacted during construction activities. Although construction activities would generate some noise, the noise would occur only during construction and is not expected to intrude into any federally designated or proposed wilderness area. None of the proposed facilities or structures would be visible from designated or proposed wilderness. There would be no adverse effects to proposed wilderness lands or values or solitude should the proposal be selected. Therefore, wilderness values was dismissed as an impact topic in this document.

Park Operations

Park maintenance and facility operations would not be altered under any alternative considered. Under the preferred alternative, some staff resources would be required to monitor construction activities, but this would be temporary. Therefore, park operations will not be addressed as an impact topic in this document.

ALTERNATIVES CONSIDERED

NO-ACTION ALTERNATIVE

Under this alternative, the canal would not be modified, and open water would continue to flow in the canal. The Park would continue to manage the canal system under the terms of the existing 1956 right-of-way (ROW). Resource damage caused by maintenance activities would continue to occur. Each year, a backhoe is used to dig out sediment and vegetation that constricts the flow of water. The material removed is placed along side the canal to add more depth to the bank and has resulted in a four-foot high berm in some locations. The vegetation that was removed dies and creates accumulations of dead branches and brush adjacent to the canal. The equipment used to do maintenance usually drives along the ditch on the bank but occasionally has to drive across natural soil and vegetation to reach the canal.

Flash floods would continue to washout the canal during the summer rainy season at breach points marked on Map 2. Soil is pushed up to repair the canal berm using a bulldozer or front-end loader resulting in environmental damage adjacent to the ditch. The equipment approaches the damaged berm by driving off-road, which causes soil compaction and vegetation crushing. Water escapes through

these breaches and soil erosion is increased by the addition of water flowing from the canal. Leakage through the sandy bottom of the canal will continue and will negatively affect water storage levels in Lower Bowns Reservoir, flows down Oak Creek, and Sandy Ranch's ability to produce crops. During drought years, these affects will be exacerbated.

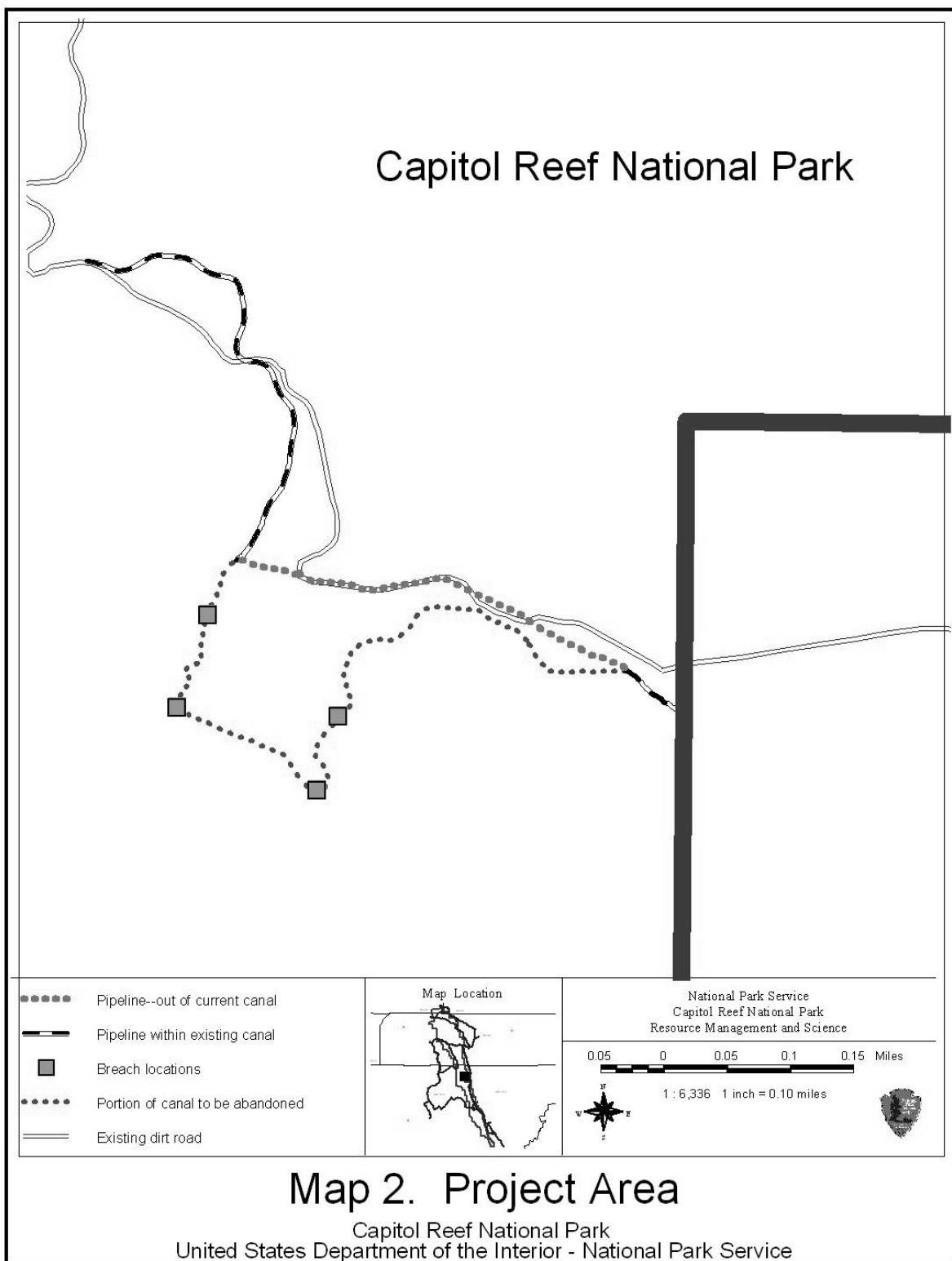
PREFERRED ALTERNATIVE

The preferred alternative is the agency (NPS) proposed action (the proposed undertaking for §106 compliance) and defines the rationale for the action in terms of resource protection and management, visitor and operational use, costs, and other applicable factors. All actions described in the preferred alternative are consistent with the approved 2001 GMP and related park documents.

Project Overview

The proposed alternative is the installation of approximately 4,069 feet of irrigation piping, the abandonment of roughly 3,491 feet of existing canal (Map 2), and issuance of a new ROW for the new pipeline outside of the existing ROW. Sandy Ranch personnel or its contractors would do all construction work on this project.

Total canal w/in park:	10,298 ft
Canal from siphon to boundary	5,846 ft
Canal from dam to siphon	4,200 ft
Siphon length	252 ft
Pipeline within canal (2,044 + 312)	2,356 ft
Siphon to diversion	2,044 ft
Near boundary	312 ft
Pipeline out of canal	1,713 ft
On road	994 ft
Across disturbed land	719 ft
Across previously undisturbed land	643 ft
Total pipe length (2,356 + 1,713)	4,069 ft
Abandoned canal length	3,491 ft



Proposed Construction

- Construction design and specification were prepared by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS)(USDA 1997). The proposed construction is a class VI design by NRCS Standard #430 with a design capacity of 5,400 gallons per minute with a pressure of less than 50 pounds per square inch (USDA 1997). Lengths in this document may vary slightly from those presented in USDA (1997) due to differences in measurement techniques, but these distances do not affect the nature of the design or construction. Construction would be undertaken by the Sandy Ranch or their contractor. The NRCS would provide assistance during construction (USDA 1997).
- From about 20 feet downstream of the siphon, install a 10' X 10' concrete inlet structure. Steel bars over the inlet would prevent accidental entry by the public. Between the inlet and siphon, construct a stilling pool. Install 2,024 feet of 21 inch PVC pipe within the existing canal. Using backhoes or similar heavy equipment, place the pipe 36 inches below the ground surface and rebury it with excavated material.
- Place 1,713 feet of 21 inch PVC pipe, from the terminus of the construction discussed above, out of the existing canal to approximately 312 feet west of the park boundary. Of the land that this portion of the pipeline passes over, at least 994 feet would be placed beneath an existing road. The remaining pipe (roughly 643 feet) would be placed in previously undisturbed ground. If possible, and as determined by on-the-ground construction conditions, some of this piping may be placed beneath the roadbed.
- Install 312 feet of 24 inch PVC piping within the existing canal from the end of the piping section described above to the pond at the park boundary. Larger diameter pipe is used in this section to reduce water velocity in order to prevent pond scouring.
- Breach the abandoned portion of the canal in at least four locations to facilitate natural hydrological flow. Approximately 3,491 feet of canal would be abandoned. Breaching would also prevent back flow into the abandoned portion of the canal, reducing erosion.
- Pipe would be buried at least three feet deep, and would be backfilled using a backhoe or similar equipment. Air vents would be installed in at least five locations, and one drain would be installed and would drain into an existing wash to limit erosion. Elbows would be installed where needed.
- Naturalize and contour the previously undisturbed land through which the pipeline passes.

Mitigation

Construction would occur only along the existing canal, along a roadbed, and 643 feet of undisturbed land. The Park possesses some flexibility in identifying the location where the pipeline would leave the existing canal, and would attempt to route the pipeline through areas with minimal vegetation. The area is sparsely vegetated, and vegetative disturbance would be minimal. Where construction would occur outside of the roadbed or existing canal, construction areas would be identified and fenced with construction tape, snow fencing, or some similar material prior to any construction activity. The fencing would define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone as defined by the construction zone fencing. No materials would be stored in areas that would not be otherwise disturbed by construction.

Temporary impacts associated with pipe installation would occur, such as soil and vegetation disturbance and the possibility of soil erosion. In an effort to avoid introduction of exotic plant species, no hay bales would be used. Hay often contains seed of undesirable or harmful non-native plant species. Therefore, as determined on a case-by-case basis, other materials may be used for any erosion control dams that *may* be necessary. These include rice straw, straws determined by NPS to be weed-free (*e.g.*, Coors barley straw or Arizona winter wheat straw), cereal grain straw that has been fumigated to kill weed seed, and wood excelsior bales. Standard erosion control measures such as silt fences and/or sandbags would also be used to minimize any potential soil erosion. Most construction would occur during winter months, a period during which precipitation is minimal.

Minimal need for re-vegetation is anticipated. Any re-vegetation plantings would use native species from genetic stocks originating in the park, or from plants previously removed from the construction area. Re-vegetation efforts would be to reconstruct the natural spacing, abundance, and diversity of native plant species. All disturbed areas would be restored as nearly as possible to pre-construction conditions shortly after construction activities are completed. The principal goal is to avoid interfering with natural processes. Subsequent to project completion, park staff would monitor and require removal of any invasive species observed. In many areas, soils and vegetation are already impacted to a degree by various human and natural activities. Construction would take advantage of these previously disturbed areas wherever possible. Soils within the project construction limits would be compacted and trampled by the presence of construction equipment and workers. The use of conserved topsoil would help preserve microorganisms and seeds of native plants. The topsoil would be re-spread in as near an original location as possible, and supplemented, where practical, with scarification, mulching, seeding, and/or planting with species native to the immediate area. This would reduce construction scars and erosion.

Some petrochemicals from construction equipment could seep into the soil. To minimize this possibility, equipment would be checked frequently to identify and repair any leaks.

Any blasting would conform to the specifications of the 1999 Director's Order 65: *Explosives Use and Blasting Safety*. All blasting would use the minimum amount necessary to accomplish the task. All blasting would be used to shatter, not distribute any material.

Earth-disturbing activities would be monitored by a qualified archeologist. Should construction unearth previously undiscovered archeological resources, work would be stopped in that area. The park Superintendent would be notified, and the park would notify the State Historic Preservation Officer, the Utah State Archeologist, and the Advisory Council on Historic Preservation, as necessary, according to 36 CFR 800.13, *Post Review Discoveries*. In the unlikely event that human remains are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed.

The National Park Service would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging archeological sites or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown archeological resources are uncovered during construction. Equipment traffic would be minimized in the area of the site. Equipment and materials staging areas would also avoid known archeological resources.

Construction workers and supervisors would be informed about the special sensitivity of park values, regulations, and appropriate housekeeping.

The park would issue a new ROW for access, operation, and maintenance of the canal, and the ROW would describe conservation measures. Issues addressed in the ROW would include a detailed description of where vehicular access is permitted. Access routes would be identified, and vehicle use out side of these areas would not be permitted. Unnecessary access routes would be blocked, abandoned, and reclaimed; all vehicular access to operate and maintain the canal and dam would be limited to identified routes on the south side of Oak Creek. Vehicular access across park land would be permissible only for park staff on official business and ranch staff operating or maintaining the canal and dam. Vehicular traffic would not be permitted beyond 300 feet upstream from the dam. Access onto park land via road would be controlled by a locked gate accessible to both park and ranch staff. To further minimize impacts to canal and surrounding area, cattle access to the area would be controlled via the installation of fences or other appropriate means. Additional conservation measures may be implemented as identified during discussions between park and ranch staff.

The existing ROW permits the ranch to maintain fences to prevent cattle from damaging the canal and dam. The new ROW would retain this right, in part because the Oak Creek area is used as a cattle-trailing route. The park and Ranch would cooperatively identify whether existing fences may be abandoned or if new fences should be constructed to eliminate damage to facilities and to protect natural and cultural resources.

ALTERNATIVES CONSIDERED BUT DISMISSED

Route pipeline entirely through existing canal

Under this alternative, the pipeline would be placed entirely within the existing canal. This alternative would result in increased cost due to a greater length of pipe required. This proposal would also add several very sharp angles to the pipeline. Because in this alignment the pipeline would pass over several washes prone to flooding, this alternative would not accomplish the stated goal of eliminating maintenance. It would not be practicable to place the pipeline in a manner such that it would not become exposed due to erosion from flooding, and maintenance would be required to maintain the pipeline, much as is required for the existing canal. Construction of the pipeline entirely within the existing canal would also be entirely within the exiting ROW, and the park would therefore not be in a position to issue a new ROW, and hence would be unable to apply additional conservation measures. For all of these reasons, this alternative was dismissed from further consideration.

Abandon Canal, Restoring Natural Stream Flow to Oak Creek

Abandoning the canal would result in the restoration of natural flow into the channel of Oak Creek, an action that would be environmentally beneficial. In time, through either natural actions or active restoration, the canal would become naturalized. However, the Sandy Ranch has a valid water right for the water from Oak Creek and a valid ROW for continued use and maintenance of the canal. The park is legislatively mandated to manage its resources in a manner consistent with the 1916 Organic Act, *while maintaining valid, existing rights* [emphasis added]. The park lacks the authority to compel the abandonment of the canal. This alternative was not considered further.

Construct pipeline and reclaim abandoned portion of canal

Under this alternative, the pipeline would be constructed as in the proposed alternative, but rather than allowing the abandoned portion of the canal to naturalize over time, the canal would be actively restored and re-contoured, the canal obliterated, and vegetation replanted. The advantage of this action would be that the ground near the abandoned canal would be restored to its natural contour. However, the park believe that this action would actually be more detrimental to the environment than allowing the area to naturalize over time because of the extensive land disturbance that would be required to re-contour the area. The scarring from this activity would be greater than the scarring that would be evident from allowing the abandoned canal to persist. In addition, the canal may be eligible for listing under the National Register of Historic Places. Destruction of the canal may be deemed an adverse affect on the canal, whereas simply abandoning the canal as in the proposed alternative would result in a determination of No Adverse Effect to the canal. For all of these reasons, this alternative was dismissed from further consideration.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

Environmentally preferable is defined as “the alternative that will promote the national environmental policy as expressed in the National Environmental Policy Act’s §101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources” (“Forty Most Asked Questions Concerning Council on Environmental Quality’s [CEQ] National Environmental Policy Act Regulations,” 1981).

Section 101 of the National Environmental Policy Act states that “... it is the continuing responsibility of the Federal Government to ... (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice; (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life’s amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.” The environmentally preferable alternative for the Oak Creek Canal project is based on these national environmental policy goals.

The no action alternative represents the current management direction for the Oak Creek Canal. It is based on existing and historic conditions. Although this alternative would not result in any construction and the associated ground disturbance, this alternative would not result in the same level of protection of natural resources as the proposed alternative.

The environmentally preferable alternative is the proposed alternative because it surpasses the no action alternative in realizing the *full range* of national environmental policy goals as stated in §101 of the National Environmental Policy Act. Although the no action alternatives achieves a greater level of protection for cultural resources (by continuing to use all of the canal), the proposed alternative does provide a high level of protection of natural and cultural resources while concurrently attaining the widest range of neutral and beneficial uses of the environment without degradation. The proposed alternative also maintains an environment that preserves important historic, cultural, and natural

aspects of the area's heritage, and integrates resource protection with an appropriate range of visitor uses.

SUMMARIES/COSTS

Table 1: Methods Each Alternative Uses to Ensure Each Objective Is Met

Objective	Alternative 1: No Action	Alternative 2: Preferred Action
1. Provide effective protection of Cultural and Natural	Protection provided by existing Park regulations, but permitted maintenance activities will continue to impact natural resources	Protection provided by existing Park regulations and new ROW
2. Allow for continued use of canal and ROW	No change in current management; use will continue unchanged.	New ROW will continue to permit use and maintenance of portions of the canal.

Table 2: Comparison of Alternatives

Alternative 1: NoAction	Alternative 2: Preferred Action
Existing Conditions maintained. The canal will continue to run water above ground; no pipeline will be installed. A new Right of Way will not be issued. Maintenance activities will continue to damage resources. Water loss from the canal will continue due to leakage and washouts.	A portion of the canal will be abandoned, and a pipeline will be installed within the existing canal, beneath previously undisturbed land, and beneath existing roads. A new Right of Way will be issued. Maintenance activities will be significantly reduced, and water loss will be minimized.

Table 3: Summary Comparison of Alternatives and Impacts

	No Action Alternative	Preferred Alternative
Geology and Soils/	Soils would be disturbed in areas where washouts occur, and where maintenance activities occur. .	Soils would be disturbed during the construction of the pipeline, but would revert to a natural state.
Biotic Communities	Vegetation would be disturbed in areas where maintenance is required. Wildlife would be temporarily displaced during maintenance activities.	Some vegetation would be disturbed during construction of the pipeline. Willows and other aquatic plants would be eliminated where the pipeline replaces the open ditch. Some wildlife would be temporarily displaced during construction. Elimination of habitat along canal would eliminate forage and refuge for wildlife, but these resources are available elsewhere in the area.
Cultural Resources	No impacts.	The pipeline will be placed within the existing canal in some locations, and portions of the canal will be abandoned. This alternative would have No Adverse Effect on cultural resources.

ENVIRONMENTAL CONSEQUENCES

NATURAL RESOURCES

Affected Environment

Eolian Deposits and the Carmel formation typify the geology of the project area. Three soil types occur in the project area (USDA 1991). Mividia fine, sandy loam typifies the areas where construction will take place. A small portion of the canal lies within reff-rock outcrop formation, and a portion of the road in which the pipeline will be installed is characterized by a red bank-mido-ustic torrifluents complex.

The proposed construction area is characterized by the trees *Pinus edulis* and *Juniperus osteosperma*, and the grasses, *Bouteloua gracilis*, *Oryzopsis hymenoides*, and *Stipa* spp. The saltbushes present are *Atriplex confertifolia* and *A. cuneata*. Other shrubs present are *Ephedra torreyana*, *Eriogonum corymbosum*, *Chrysothamnus viscidiflorus*, *Artemisia biglovii*, *Shepherdia rotundifolia*, *Gutierrezia sarothrae*, and *Amelanchier utahensis*. Cacti present are *Opuntia polyacantha* and *Scelerocactus parviflorus*. Willow (*Salix* sp.) occurs intermittently along the existing canal, and a few cottonwoods (*Populus fremontii*) are present near the pond. Wildlife species observed in the area include mule deer, coyotes, rabbits and hares, and various songbirds. No threatened, endangered, or candidate animal species are found in the project area, and no wetlands exist in the project area.

Methodology for Assessing Impacts

Impacts are described in terms of context (are the effects site-specific, local, or even regional?), duration (short-term or long-term?), and intensity (negligible, minor, moderate, or major?). The thresholds of change for the duration and intensity of an impact are defined as follows:

Short-term: The impact lasts one year or less.

Long-term: The impact lasts more than one year

Negligible: the impact is at the lowest levels of detection

Minor: the impact is slight, but detectable

Moderate: the impact is readily apparent

Major: the impact is a severe or adverse impact or of exceptional benefit

Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Quality Act (NEPA), require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7).

Cumulative impacts are determined by combining the impacts of the preferred alternative with other past, present, and reasonably foreseeable future actions. Therefore it was necessary to identify other ongoing or reasonably foreseeable future actions within Capital Reef National Park and, if applicable, the surrounding region. There are no projects or actions under consideration or identified in the 2001 GMP which would result in cumulative impacts if this project were approved.

Impacts to Cultural Resources and Section 106 of the National Historic Preservation Act

In this environmental assessment, impacts to the potentially eligible cultural are described in terms of type, context, duration, and intensity, as described above, which is consistent with the regulations of the Council on Environmental Quality (CEQ) that implement the National Environmental Policy Act (NEPA). These impact analyses are intended, however, to comply with the requirements of both NEPA and Section 106 of the National Historic Preservation Act (NHPA). In accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 of the NHPA (36 CFR Part 800, *Protection of Historic Properties*), impacts to archeological resources and the cultural landscape were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that were either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register; and (4) considering ways to avoid, minimize or mitigate adverse effects.

Under the Advisory Council's regulations a determination of either *adverse effect* or *no adverse effect* must also be made for affected cultural resources. An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualify it for inclusion in the National Register, e.g. diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the preferred alternative that would occur later in time, be farther removed in distance or be cumulative (36 CFR Part 800.5, *Assessment of Adverse Effects*). A determination of *no adverse effect* means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register.

CEQ regulations and the National Park Service's *Conservation Planning, Environmental Impact Analysis and Decision-making* (DO-12) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g. reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effect remains adverse.

A Section 106 summary is included in the impact analysis sections for cultural resources under the preferred alternative. The Section 106 Summary is intended to meet the requirements of Section 106 and is an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based upon the criterion of effect and criteria of adverse effect found in the Advisory Council's regulations.

Impacts of the Preferred Alternative

Geology and Soils

Soils would be disturbed by construction activities. Impacts to these resources would occur primarily where the new pipeline is placed outside of the roadbed and existing canal. These impacts would be short in duration and minor. Approximately 2.75 acres of surface area will be disturbed by construction, but most of this would be either within the existing canal ROW or along the road. The disturbed area would be reclaimed, re-contoured, and natural re-vegetation allowed to occur except along the roadway. The construction area outside the canal would be expected to recover to a state similar to that prior to construction.

Cumulative Impacts

Past and current operation of the irrigation canal continues to disturb soils within the project area. Reasonably foreseeable actions may include maintenance to repair the pipeline which could entail soil disturbance. Such maintenance would be rare, if it occurred at all, and would be of minor intensity. The cumulative effect of this alternative, in combination with other past, present, and foreseeable future actions, would be beneficial and of minor intensity.

Conclusion

There would be some temporary impact to previously undisturbed soils, and the potential for future impacts caused by maintenance activities. However, these disturbances would be temporary, whereas continued operation of the canal under current conditions would result in greater disturbance to soils. Overall, impacts to soils would be short term and of minor intensity.

The cumulative effect if the preferred alternative on the park's geology and soils, in combination with other past, present, and reasonably foreseeable future actions, would be beneficial and of minor intensity.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Capitol Reef National Park; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

Biotic Communities

Impacts to wildlife would be minor. Wildlife that uses the area will be temporarily displaced during construction. Deer, small mammals, and songbirds that utilize willows for food or shelter will be directly impacted by loss of this species. Wildlife also will be temporarily disrupted by the noise associated with construction activities. There will be no impact to threatened, endangered, or candidate animal species.

The elimination of willows along the canal will presumably eliminate some habitat for some species of small mammals and birds, as well as forage for mule deer. The magnitude of this impact will be minor, as little of this habitat is actually present, and it is restricted to within one or two feet of the canal. In addition, yearly maintenance to allow water flow includes removal of the vegetation, so any benefits from the vegetation is sporadic. Further, the habitat is an artifact of human activities. Elimination of this vegetation from the area through construction activities or future desiccation represents a return to a more natural condition.

Animals presumably use the canal as a drinking water source, but other permanent waters exist in the area in natural watercourses (*e.g.*, in Oak Creek), and as with the willow, the presence of a seasonally permanent water source in the construction area is an unnatural artifact caused by human activities.

Although vegetation is present along the canal, it is a result of man-made conditions. Because vegetation restricts the flow of water and can cause the canal to fail, it is removed yearly by maintenance operations of Sandy Ranch. Some larger trees have grown up from water seepage out of the canal and these may die when that seepage is cut off. Their disappearance will be a minor impact as the vegetation community returns to a more natural state. The selected location is in an area that to a large degree has already been disturbed by historic activities, including road building and canal construction. Hence, except for the small stretch where the pipe will be placed outside of the roadbed and the canal, undisturbed areas would not be impacted. These impacts would be minor. There would be no impacts on floodplains or wetlands.

Cumulative Impacts

Some vegetation would be lost during construction. Impacts would be adverse, short- and long-term, and of minor intensity. Some vegetation would be removed from areas that are excavated, but these areas would naturalize over time, and vegetation would become re-established. Some plants, *e.g.*, willows, would be permanently lost, but these species exist in the project area solely because of the canal, and exist naturally within the Oak Creek drainage adjacent to the project area. Some wildlife would be temporarily displaced during construction activities, and those species using the surface water and plant species associated with the canal would be permanently displaced. However, the habitat is an artifact of the canal, and similar habitat is available in the Oak Creek drainage.

Actions proposed in this alternative would have both short and long-term impacts on biotic communities, and would be of minor intensity. In the short-term, some vegetation will be lost through construction activities, and in the long-term, some vegetation associated with the water in the canal will be permanently lost, and less vegetative disturbance will occur over time because regular maintenance and repair of the canal will not be required, and the vegetation will return to a more natural state. The park would issue a new ROW, which would allow specific measures to be implemented, which would further benefit plant and animal species. The cumulative effect if the preferred alternative on the park's biotic communities, in combination with other past, present, and reasonably foreseeable future actions, would be beneficial and of minor intensity.

Conclusion

There would be some temporary impact to vegetation due to construction activities. Some vegetation would be permanently lost due to an absence of surface water. In the long-term, vegetation within the project would return to more natural state. Wildlife would be temporarily displaced by construction activities, and wildlife that used the canal and associated vegetation would be permanently dislocated, but this would reflect a return to more natural conditions. Long-term impacts to plants and wildlife overall would be beneficial and of minor intensity.

The cumulative effect of the preferred alternative on the park's biotic communities, in combination with other past, present, and reasonably foreseeable future actions, would be beneficial and of minor intensity.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of

Capitol Reef National Park; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

Cultural Resources

The park prepared an assessment of Historic Resources and Cultural Resources, and the results were compiled in *Cultural Resources Survey of Proposed Sandy Ranch Irrigation Culvert Location, Capitol Reef National Park* (Appendix A). Additionally, an Assessment of Affect for the proposed project was completed in August 1999 (Appendix B), and proposed a finding of No Adverse Effect. A letter sent to the State Historic Preservation Office in September 1999 (Appendix C) requested their concurrence, which was received in October 1999 (Appendix D).

Cumulative Impacts

Various alterations to some of the landscape elements of the park have occurred over the years, including changes to, buildings, construction of employee housing within a historic orchard, and paving of roads within the park. Because the impacts associated with implementation of the preferred alternative would be such a small component of any overall cumulative impact, and because a determination of No Adverse Effect has been made, the preferred alternative would not result in adverse cumulative impacts to the cultural resources of the park.

Section 106 Summary

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service determines that implementation of the preferred alternative would have *no adverse effect* on the canal, which may be eligible for inclusion on the National Register of Historic Places.

Conclusion

The preferred alternative would have no adverse impact upon the cultural resources of the area. Under Section 106 of the National Historic Preservation Act, implementation of the preferred alternative would have *no adverse effect* on the Historic Landscape.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Capitol Reef National Park; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

Impacts of the No Action Alternative

The primary impact of the no action alternative would be the disturbance of the soils and vegetation in the area during canal maintenance and repair. These impacts would occur over the long-term and would be considered minor to moderate in intensity. Under this alternative, the park would not issue a new ROW, relying instead on the existing ROW, and so the park would be unable to implement additional mitigation measures to canal operation and maintenance. Wildlife would be temporarily disrupted by the noise and vegetation removal associated with maintenance activities, but these impacts would be negligible, would occur over the long-term, and would occur at least annually. There would be no impact to federally listed

threatened, endangered, or candidate animal species. Although they represent only a minor impact, these activities occur regularly and at least annually, resulting in a cumulative minor impact over the long-term.

The geographic area used in the consideration of cumulative impacts includes the area immediately adjacent to the existing and proposed canal and pipeline. Existing management of the canal has minor impact on the soils along the canal where washouts occur. Repair of the canal necessitates off-road travel by maintenance vehicles and extensive earth moving to repair the canal. The most direct impact by off road travel occurs when vehicles drive over soils and vegetation. The cumulative affect of this regular ground disturbance by maintenance activities causes soil compaction and crushing of vegetation. This impedes plants from establishing in these areas, and impacts cryptobiotic soils.

Cumulative Impacts

Past development and maintenance within the project area has led to soil disturbance and impacts to vegetation. Reasonably foreseeable actions may include continued maintenance of the canal, including vegetation removal and reconstruction of the canal when washouts occur. Reasonably foreseeable actions would have adverse but minimal impacts on geology and soils and biotic communities. The cumulative effect of the no-action alternative on the park's soils and geology, biotic communities, in combination with other past, present, and foreseeable future actions, would be adverse and of minor to moderate intensity.

Conclusion

The Oak Creek Canal would continue to wash out, requiring frequent maintenance. Continued long term, minor to moderate impacts to soils and vegetation would occur due to impacts associated with maintenance activities. The cumulative effect of the no-action alternative on the park's soils and geology, biotic communities, in combination with other past, present, and foreseeable future actions, would be adverse and of minor to moderate intensity.

Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Capitol Reef National Park; (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning document, there would be no impairment of the park's resources or values.

CONSULTATION/COORDINATION

AGENCIES/TRIBES/ORGANIZATIONS/INDIVIDUALS CONTACTED

Utah State Historic Preservation Office

Steve Dalton, Sandy Ranch

Jim Sharum, NPS Intermountain Support Office, Denver

Sayre Hutchison, NPS Intermountain Support Office, Denver

Chris Turk, NPS Intermountain Support Office, Denver

Laurie Domler, NPS Intermountain Support Office, Denver

Shane Baker, Brigham Young University, Utah

Adrienne Anderson, NPS Intermountain Support Office, Denver

Kevin Jones, Field Solicitor, US Department of Interior

Keith Durfey, Range Conservationist, Capitol Reef National Park

Al Hendricks, Superintendent, Capitol Reef National Park

Tom Clark, Chief, Resource Management and Science, Capitol Reef National Park

Lee Kreutzer, Archeologist, Capitol Reef National Park

PREPARERS

David Worthington, Biologist, Capitol Reef National Park

LIST OF RECIPIENTS

The following agencies, organizations, and groups were sent copies of the Environmental Assessment:

Salt Lake Tribune
P.O. Box 867
Salt Lake City, UT 84110

Radio KSVC/KKWZ
P.O. Box 848
Richfield, UT 84701

Deseret News
P.O. Box 1257
Salt Lake City, UT 84110

Richfield Reaper
P.O. Box 640
Richfield, UT 84701

Tom Keohan
Intermountain Denver Support
Office - Denver (IMDE-FM)
P.O. Box 25287
Denver, CO 80225-0287

Sayre Hutchison
Intermountain Denver Support
Office - Denver (IMDE-FM)
P.O. Box 25287
Denver, CO 80225-0287

Chris Turk Intermountain Denver Support Office - Denver (IMDE-FM) P.O. Box 25287 Denver, CO 80225-0287	State Director National Park Service Box 45155, 324 South State Street, Room 301B Salt Lake City, UT 84145-	Superintendent Bryce Canyon National Park Bryce Canyon, UT 84717
Superintendent Canyonlands National Park 2282 Southwest Resource Blvd. Moab, UT 84532-3298	Superintendent Glen Canyon NRA P.O. Box 1507 Page, AZ 86040	Area Manager Bureau of Land Management 151 East 900 North Richfield, UT 84701
Field Supervisor US Fish and Wildlife Service 145 East 1300 South, Suite 404 Salt Lake City, Utah 84115	Forest Supervisor Dixie National Forest 82 N 100 E Cedar City, UT 84720-2686-	Forest Supervisor Fishlake National Forest 115 East 900 North Richfield, UT 84701
District Ranger Teasdale Ranger District, Dixie National Forest 138 E Main Teasdale, UT 84773	District Ranger Loa Ranger District, Fishlake National Forest 138 S Main Loa, UT 84747	Natural Resources Conservation Service P.O. Box 534 Richfield, UT 84701
ASCC, USDA Box 128 Loa, UT 84747	Natural Resources Conservation Service 138 S Main Loa, UT 84747	U.S. Army Corps of Engineers 577 West 1350 South, Suite D Bountiful, UT 84010
Max Evans, State Historic Preservation Officer State Historic Preservation Office 300 Rio Grande, Salt Lake City, UT 84101-1182	Director Division of Wildlife Resources Department of Natural Resources 1594 West North Temple, Suite 2110 P.O. Box 146301 Salt Lake City, UT 84116	Director Utah Department of Health 70 West Westview Drive Richfield, UT 84701
Director Utah Dept. of Transportation 708 South 100 West Richfield, UT 84701	Six County Association of Governments 250 N. Main Richfield, UT 84701	Wayne County Commissioners 18 S. Main Loa, UT 84747
Garfield County Commissioners P.O. Box 77 Panguitch, UT 84759	Historic Preservation Office Hopi Tribe P.O. Box 123 Kykotsmovi, AZ 86093	Historic Preservation Office Navajo Nation P.O. Box 308 Window Rock, AZ 86022
Historic Preservation Office Paiute Indian Tribe of Utah 600 N. 100 E. Paiute Drive Cedar City, UT 84720	Historic Preservation Office Ute Mountain Ute Tribe General Delivery Towaoc, CO 81344	Historic Preservation Office Peublo of Zuni PO Box 339 Zuni, NM 87317-0339

Historic Preservation Office
White Mesa Ute Tribe
P.O. Box 340
Blanding, UT 84511

National Parks Conservation
Association
100 Eagle Lake Drive
Fort Collins, CO
80520

Southern Utah Wilderness Alliance
1470 South 1100 East
Salt Lake City, UT 84105

Sierra Club
2273 South Highland Drive
Salt Lake City, UT 84101

Richfield Public Library
83 E. Center
Richfield, UT 84701

REFERENCES

U.S. Department of Agriculture, Soil Conservation Service. 1991. Soil Survey Report, Capitol Reef National Park.

U.S. Department of Agriculture, Natural Resources Conservation Service, Richfield Field Office. 1997. Drawing and Specifications, Sandy Ranch Pipeline, Fremont River Soil Conservation District.

U.S. Department of the Interior, National Park Service. 2001. Record of Decision, Final General Management Plan and Environmental Impact Statement, Capitol Reef National Park. Intermountain Region, Denver, Colorado.

U.S. Department of the Interior, National Park Service. 1974. Wilderness Recommendation, Capitol Reef National Park, Utah.

APPENDIX A: CULTURAL RESOURCES DOCUMENTATION -- CULTURAL RESOURCES SURVEY

*CULTURAL RESOURCES SURVEY OF PROPOSED SANDY RANCH IRRIGATION CULVERT
LOCATION, CAPITOL REEF NATIONAL PARK, UTAH*

Lee Kreutzer, Park Archeologist

April 19, 1999

Project Background

Sandy Ranch, located near Notom on the east side of the park, proposes to divert a portion of its open irrigation ditch system off Oak Creek into underground pipes. A shallow trench for the pipe will be excavated down the center of an existing access road where the road is fairly straight. Sharp bends in the road will require that the pipeline leave the roadbed for short distances, so that the line can be as nearly straight as possible. Approximately 3,491 feet of the 10,298-foot existing open ditch would then be abandoned to the park. The attached photocopied topographic maps indicated the general location of the proposed new pipeline; a more precise map, produced by GPS technology, indicates the precise routing of the line (Figs. 1-2).

The purpose of the project is to reduce water loss from the open ditch. Loss is calculated to be $\frac{3}{4}$ of a second/foot, amounting to nearly six days worth of water lost annually. Piping the flow would prevent loss through evaporation, leaching, and breaches in the ditch, and would considerably reduce maintenance requirements.

Sandy Ranch has legal right to the water it uses. An open ditch siphoning water from Oak Creek has been in use there since at least 1914, when the original dam was constructed. The existing ditch is in the same general location as the original ditch, although some adjustments likely have been made to improve efficiency or repair breaches.

Environmental Context

Capitol Reef National Park encompasses the Waterpocket Fold, a 100-mile-long monocline in the Colorado Plateau. The area surrounding the park ranges from arid desert canyons to the forested mountains of Thousand Lake, Boulder, and the Henry Mountains. Capitol Reef is long and narrow – roughly 75 miles long and ranging in width from half a mile to 13.5 miles. Elevations within the park vary from below 1300 meters to just under 3,000 meters above mean sea level. Precipitation averages 7.2 inches per year at the Visitor Center in Fruita.

Dominant vegetation communities at Capitol Reef are typical of the Great Basin Physiographic Province.

Thirty-four plant communities are identified, with 11 being unique to or first described in the park.

There are four badland types, three grassland types, seven upland shrub types, six pinyon-juniper types, five forest types, and nine wetland-riparian types. Due to the rapid elevation changes, communities grade

from one into another rather than occurring in discrete units, except where soil texture or moisture change abruptly.

Livestock grazing and other agricultural activities have heavily impacted the project area itself. Pinyon/juniper woodlands dominate the natural areas, and prickly pear cactus, rabbitbrush, and bunch grasses are also present. Much of the nearby area is regularly irrigated with sprinkler systems for agricultural purposes. The nearest natural source of water is Oak Creek.

Culture History Overview

Paleo-Indian, Archaic, Formative, Late Prehistoric, and Historic Period occupations have been documented throughout the park in general. In the Waterpocket District specifically, Brigham Young University identified Archaic, Formative, and Late Prehistoric sites during archeological survey in 1996 and 1997.

Archaic Period

The transition from Paleo-Indian to Archaic lifeways occurred in Utah around 8,000 B. P., coinciding with the establishment of warmer, moister climatic patterns. As post-Pleistocene environmental conditions stabilized, migratory bird flyways, river courses, anadromous fish runs, and mollusk beds were established, making these and other resources predictable and reliable for human predators. Accordingly, prehistoric peoples developed more broad-based subsistence patterns, eventually adopting annual rounds in response to seasonal resource availability. During this period, Southwestern peoples began making ground stone manos and metates for grinding wild plant foods, baskets for food gathering, winnowing and seed parching, nets for catching birds and other game, digging sticks for harvesting edible roots, spearthrowers and darts for hunting, and other new technologies. Bison, deer, sheep, rabbits, rodents, waterfowl, invertebrates, and a variety of grasses and other wild plants all contributed to the diet of Archaic peoples. Unlike Paleo-Indian peoples, who left behind little evidence of their camps and dwellings, Archaic peoples tended to stay longer in their camps and return to the same areas year after year.

Archaic Period sites are generally identified by their diagnostic projectile point styles and radiocarbon dates on campfire materials. Some 22 Archaic components were identified in the Waterpocket District during the 1996 field season.

Formative Stage

The introduction of domesticated plants (corn, beans, and squash) from Mexico into the Southwest ultimately led people here to shift away from high residential motility, to adopt sedentary or semi-sedentary settlement patterns, establish permanent villages, and rely increasingly on farming as a means of subsistence. These traits, as well as the use of the bow and arrow (introduced from the north), characterize the Formative Period of occupation in the Southwest and Colorado Plateau.

In Southern Utah, two Formative Stage cultures are the Anasazi and the Fremont. Sharing numerous general material culture traits, the two groups were long considered to be variants of the same basic culture. It wasn't until 1931 that Noel Morss, who visited Capitol Reef as part of the Claflin-Emerson Expedition, distinguished the two primarily on the basis of divergent pottery, basketry, footgear, rock

art, and architectural styles. Even so, the Fremont and Anasazi shared many traits.

Both groups overlapped temporally in the area around Capitol Reef, with the Anasazi predominantly (but perhaps not exclusively) on the south end of the park and the Fremont people utilizing the rest.

Traits diagnostic of both Anasazi and Fremont cultures disappear from the archeological record at around A.D. 1250, for reasons that are still debated among archeologists. The disappearance of diagnostic traits has been attributed variously to abandonment spurred by environmental degradation, climate change, and competition with Numic-speaking peoples who may have entered the region at about that time. Any of these variables may have caused Formative peoples to adopt new subsistence and settlement strategies (causing their better-known cultural manifestations to “disappear” from the record), to merge with other cultural groups, or as often is argued, to leave their settlements and migrate elsewhere. The “disappearance” issue is important not only for historical reasons, but also because it holds implications for modern tribes who are descended from the Fremont and Anasazi peoples.

During the 1996 field season, 22 Formative (Fremont and/or Anasazi) components were identified in the park’s Waterpocket District, based on diagnostic projectile point and pottery styles found there.

Late Prehistoric/Historic Periods

The timing of their arrival is uncertain, but the presence of Numic-speaking Paiute and Ute peoples in the Capitol Reef region is documented by early explorers and settlers. These peoples have occupied central Utah since about A.D. 1150 – 1300.

Primarily hunters and gatherers rather than farmers, the Utes and Paiutes occupied sites for relatively short periods, establishing temporary shelters and villages and moving seasonally to harvest resources. They left behind their own distinctive rock art, basketry, projectile points, and pottery.

The 1996 archeological survey documented nine Late Prehistoric components in the Waterpocket District. No Historic Period American Indian sites were positively identified there.

History of the Sandy Ranch

Euro-Americans – primarily cattle and sheep ranchers—began settling the area in the 1880s. Sandy Ranch was established in 1904 by rancher William Bowns. Drought and increasing competition for cattle and sheep forage (Sandy Ranch and the nearby George Durfey Ranch sheared tens of thousands of sheep annually in the early decades of the past century) resulted in severe range degradation throughout the region. The Oak Creek Dam was built during the apogee of this period of environmental crisis.

In 1913, Bowns developed the Oak Creek, Torgerson, and Upper and Lower Bowns Reservoirs on Boulder Mountain to divert water through the Waterpocket Fold via Oak Creek Canyon. At the eastern end of Oak Creek Canyon, he built a 45-foot-high by 106-foot-long rock and cement dam in 1914. This dam diverted the flow into a canal, flume, and series of ditches to water Bowns’s Sandy Ranch holdings. The Oak Creek dam was improved in 1955 and again in 1964 or 1965, because of siltation behind the dam and an increased demand for water (Frye, in press). The original dam, canal, and flume

are still in use; the ditch to be undergrounded is also part of this system.

Because of the early water developments built by Bowns, Sandy Ranch has a water rights priority date of 1913. Historian Brad Frye, who researched the Sandy Ranch water rights records, reports that the ranch owns the following water rights:

- 1) 16.09 c.f.s. of upper Pleasant Creek under Certificate 2313;
- 2) 2.74 c.f.s. from an unnamed tributary of Oak Creek under Certificate 2313;
- 3) 9.0 c.f.s. of Oak Creek water under Certificate 5045.

Today, Sandy Ranch is primarily used for cattle production, but it also produces hay and nursery trees for commercial purposes. The Oak Creek Dam, canal, flume, and ditch system remains an integral part of its operation.

Previous Cultural Resources Surveys in the Project Area

Archeological survey was undertaken in 1977 by Archaeological-Environmental Research Corporation on behalf of the Bureau of Land Management for the Central Coal Project of Utah. Although the available documentation is difficult to interpret, crews appear no to have recorded any cultural resources within the proposed project area.

Bureau of Land Management Archeologist Marian Revitte completed a fenceline survey of the area in January 1986, documenting two sites. 42GA3112 is a large lithic scatter with a possible hearth located on a wide bench. 42GA3113 is a lithic scatter with two possible hearths, located nearby on the same bench. Revitte found both sites eligible for listing under Criterion D, and noted that the entire bench appeared to have seen repeated prehistoric use. Both sites are well outside the proposed project area, and were not relocated for this study.

A 1992 historic resources survey conducted by Patrick O'Bannon of John Milner & Associates Inc., identified the Oak Creek Dam as being eligible for listing on the National Register. Specifically, O'Bannon found the dam to have local significance under Criterion A, for its association with agriculture (cattle ranching) in the Capitol Reef area. The Oak Creek dam is the largest single structure associated with large-scale irrigation still extant in the park. The dam itself is included in a Multiple Property Nomination currently under consideration by the National Register. For reasons that are unclear, however, the flume, canal, and ditches were not evaluated either as part of the historic resources study or for the actual nomination. It is the opinion of the park's archeologist that these components of the system are also eligible for listing under Criterion A.

Brigham Young University crews in 1998 surveyed the entire Oak Creek corridor, including much of the proposed project area (Fig. 3). Those crews identified four prehistoric sites near the project area:

- 42GA4438 – prehistoric lithic and groundstone scatter with historic component consisting of historic cans. Not eligible for listing due to lack of diagnostic artifacts, buried deposits, and general research potential.
- 42GA4439 – Lithic scatter. Not eligible for listing due to lack of diagnostic artifacts, buried deposits, and general research potential.

- 42GA4440 – Lithic and ceramic scatter with late prehistoric component. Eligible for listing.
- 42GA4441 – Lithic and ceramic scatter with midden. Eligible for listing.

All of these sites are outside of the project area, and will not be affected by the proposed pipeline.

Methodology and Results of 1999 Survey

On April 19, 1999, Park Archeologist Lee Kreutzer and two assisting crewmembers (Tom Clark and Dave Worthington) surveyed the proposed pipeline alignment for cultural resources. The route was walked and electronically mapped. The surveyed transect encompassed 10 meters from either side of the centerline. No cultural resources were identified.

APPENDIX B: CULTURAL RESOURCES DOCUMENTATION – ASSESSMENT OF AFFECT

ASSESSMENT OF EFFECT FORM ROCKY MOUNTAIN REGION

ASSESSMENT OF ACTIONS HAVING AN EFFECT ON CULTURAL RESOURCES

This form is required for all actions that have the potential to affect cultural properties. Attach continuation sheets as necessary.

1. PARK: Capitol Reef National Park Include park sub-district if applicable.

2. PROJECT TITLE: Sandy Irrigation

PROJECT NUMBER: CARE 99-04

PACKAGE NUMBER: NA

PROJECT LOCATION: Quad(s) & Scale Sandy Creek Benches 7.5' and Bear Creek Canyon 7.5'

LEGAL (Township/Range/Section) Sandy Creek:

OR UTM(s) (if known)

PROJECT TYPE: ☐ Planning ☐ Design ☒ Construction

3. PREPARED BY: Lee Kreutzer, Park Archeologist

PHONE: (435) 425-3791 xt 146

FOR ADDITIONAL INFORMATION CONTACT: Tom Clark, Chief, Resources Management

PHONE: (435) 425-3791 xt 144

4. **IDENTIFICATION OF RESOURCES:** Has project area been surveyed for:

	Yes	No	NA
Buildings	<u>x</u>		
Structures	<u>x</u>		
Cultural landscapes	<u>x</u>		
Ethnographic resces	<u>x</u>		
Archeological sites	<u>x</u>		

If Yes: Results of survey

x No resources identified in project area

☐ Identified properties already determined eligible or listed on the National Register of Historic Places (list).

Sandy AOE--1

___ Identified properties for which a Determination of Eligibility is needed (list). Attach supporting documentation.

Identified properties for which a determination of Eligibility is needed are:

If No: Is survey scheduled? Yes ___ No ___: Date

___ not needed (provide justification, such as area previously disturbed)

5. IDENTIFICATION DOCUMENTATION:

1) Level of Survey Work: ___ Reconnaissance ___ Sample
___x___ Intensive ___ Tested ___ Excavated

2) File search: ___x___ CSI ___ State SHPO ___ Other

3) Report(s) Reference(s) [Include Author(s), date and title]

Kreutzer, Lee (1999) Survey of Proposed Sandy Ranch Irrigation Culvert Location.
Archeological-Environmental Research Corporation (1977)
Revitte, Marian (1986) Fenceline Survey for Bureau of Land Management
O'Bannon, Patrick (1992) Historic Resources Survey, Capitol Reef National Park
Office of Public Archaeology, Brigham Young University (1998) Archeological Survey

6. Description of proposed undertaking(s). Include rationale for the undertaking.

Sandy Ranch proposes to underground a portion of its irrigation ditch system off Oak Creek, south of Oak Creek dam and the nearby concrete siphon. This project involves installing a pipe or culvert in a new trench (to be backfilled) mostly down the middle of an existing access road. In places, particularly near curves, the new pipeline would leave the roadbed. Approximately 3,491 feet of the 4,069-foot existing open ditch would be abandoned to the park. The attached photocopied topographic map indicates the approximate location of the proposed new pipeline; a more precise map, produced by GPS, is also attached.

Sandy Ranch managers have calculated water loss from the open ditch at $\frac{3}{4}$ of a second/foot, amounting to nearly six days worth of water annually. Undergrounding the ditch will prevent loss through evaporation, leaching, and breaches in the ditch, and will considerably reduce maintenance requirements.

7. Description of impacts of the undertaking on the resources identified in Item 4.

The only historic resource identified in the survey was the Oak Creek Dam. This undertaking would not affect the dam, which is outside the project area.

8. MITIGATION:

1) Proposed mitigation and any special stipulations:

Excavation should be monitored, and ditch should be abandoned but not naturalized with ground-disturbing equipment.

2) Is the mitigation work scheduled? Yes ___ No ___ NA x___

If yes, scheduled with: Region ___ Archeological Center ___ Other _____

3) Will fabric or artifacts be accessioned into park collection?

Yes ___ No ___ NA x___

If yes, list objects to be curated.

9. The proposed action will (check as many as apply):

1) FABRIC:

- ___ Destroy historic fabric.
- ___ Remove historic fabric.
- ___ Replace historic fabric in kind.
- ___ Add nonhistoric elements to a historic structure.
- ___ Remove nonhistoric elements from a historic structure.

2) HISTORIC SCENE:

- ___ Alter historic terrain, groundcover, or vegetation
- ___ Introduce nonhistoric elements (visible, audible, or atmospheric) into a historic setting or environment
- ___ Reintroduce historic elements in historic setting or environment
- ___ Remove historic elements from a historic environment
- ___ Remove nonhistoric elements from a historic environment

3) ARCHEOLOGICAL RESOURCES:

- ___ Disturb, destroy, impair, or render inaccessible archeological (surface or subsurface) resources
- ___ Possibly disturb presently unidentified archeological resource or historic fabric

4) ETHNOGRAPHIC RESOURCES:

- ☐ Disturb, impair, alter or render inaccessible ethnographic resources
- ☐ Introduce inappropriate elements (visible, audible, or atmospheric)
- ☐ Possibly disturb presently unidentified ethnographic resources

5) OTHER:

- ☐ Incur gradual deterioration of historic fabric, terrain, or setting.
- ☐ Involve a land transaction, sale, or lease.
- ☐ Other (Describe briefly):

10. Documentation attached: **REQUIRED: (x) maps, (x) site plan(s),**

(x) preliminary design or construction documents, (x) photographs,
() Scope-of-Work, () Inventory forms, () National Register forms () RMR Archeological Project Report, () Product samples, () Other

11. PROGRAMMATIC AGREEMENT:

A. Servicewide Programmatic Agreement 1995.

1) ☐ Undertaking included in an approved plan under PA (name of planning document and pertinent page numbers).

2) ☐ Undertaking meets requirements for programmatic exclusion under Stipulation C.1 or C.2. List appropriate exclusion(s).

B. Other Memorandum(a) of Agreement or Programmatic Agreements. Identify agreement, including specific exclusion(s):

NA

12. PUBLIC INVOLVEMENT (If undertaking will have an adverse effect, identify organizations and groups that have been contacted).

NA

13. NATIVE AMERICAN CONSULTATION

☒ Not necessary ☐ Necessary

If necessary identify organizations and individuals that have been contacted:

14. Recommended Determination of Effect.

☒ No Cultural Resources Affected ☐ No Cultural Resources Adversely Affected ☐ Cultural Resources Adversely Affected

No cultural resources are located within the proposed project area.

I certify that the work proposed meets the guidelines contained in NPS-28 and that the proposal incorporates all feasible measures to minimize adverse effects on cultural resources.

Original signed August 16 1999

Park Archeologist _____ Date

Comments:

Original signed August 17 1999

Capitol Reef National Park Superintendent _____ Date

Comments:

APPENDIX C: CULTURAL RESOURCES DOCUMENTATION – LETTER TO UTAH STATE HISTORIC OFFICER

OCT-21-1999 17:02

UTAH STATE HISTORICAL SOC

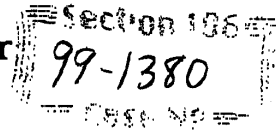
P.02/02



IN REPLY REFER TO:

United States Department of the Interior

NATIONAL PARK SERVICE
Capitol Reef National Park
Torrey, Utah 84775



H4217 (CARE-MR)

September 3, 1999

Ms. Barbara Murphy
State Historic Preservation Office
300 Rio Grande
Salt Lake City, UT 84101

Dear Ms. Murphy:

Enclosed for your review is an Assessment of Effect for development of an irrigation pipeline serving the Sandy Ranch, located east of Capitol Reef National Park. The proposal calls for diverting the flow of Oak Creek water from a segment of existing open ditch into a buried pipeline. The purpose of the project is to reduce water loss and ditch maintenance costs to the ranch. The park recommends a finding of No Adverse Effect for this project.

The original ditch, which dates to 1914, would revert to park ownership and management. It would not be maintained by the park, but would be mapped and monitored. Although the Oak Creek dam is included in the Multiple Property Nomination under consideration by the National Register, the flume, canal, and ditch system were never evaluated. Park Archeologist Lee Kreutzer believes the entire system may be eligible for listing under Criterion A. However, until ownership can be ascertained (Sandy Ranch may legally own the flume, canal, and operating ditch system), no Determination of Eligibility will be requested.

Thank you for your assistance with this project. If you have questions regarding this Assessment of Effect, please contact Park Archeologist Lee Kreutzer (extension 146).

Sincerely,

Albert J. Hendricks
Superintendent

enclosure

APPENDIX D: CULTURAL RESOURCES DOCUMENTATION – LETTER FROM UTAH STATE HISTORIC OFFICER

UTAH STATE HISTORICAL SOCIETY

P.01/02



Department of Community and Economic Development
Division of State History
Utah State Historical Society

UTAH STATE
HISTORICAL
SOCIETY

Michael O. Leavitt
Governor
Max J. Evans
Director

300 Rio Grande
Salt Lake City, Utah 84101-1182
(801) 533-3500 FAX: 533-3503 TDD: 533-3502
ushs@history.state.ut.us http://history.utah.org

October 4, 1999

Albert J. Hendricks
Superintendent
Capitol Reef National Park
Torrey UT 84775

RE: Sandy Ranch Irrigation, Capitol Reef National Park

In Reply Please Refer to Case No. 99-1380

Dear Mr. Hendricks:

We concur the irrigation system at including the Oak Creek dam appears to be eligible for the National Register of Historic Places based on its age and integrity. No determination of significance is being made at this time. The proposed work, while affecting the property, appears to meet the Secretary of the Interior's "Standards for Rehabilitation." This allows a determination of No Adverse Effect for this project because the proposed rehabilitation will preserve the historical and architectural character of the historic property.

This information is provided to assist the National Park Service with Section 106 responsibilities as specified in §36CFR800. If you have questions, please contact me at (801) 533-3563. My address on internet is : bmurphy@history.state.ut.us

Sincerely,

Barbara L. Murphy
Preservation Planner
State Historic Preservation Office

BLM:99-1380 NPS/DOE/NPA

APPENDIX E: PUBLIC INVOLVEMENT

A press release was distributed to local media outlets upon publication of this Environmental Assessment (EA) and legal notices were sent to two newspapers, the locally published *Insider* and the *Richfield Reaper*, published in Richfield, Utah. Copies of the EA were distributed to regional federal, state, and county agencies, media outlets, and potentially interested tribal nations and non-government organizations.